Acta Derm Venereol 2013; 93: 679–683

INVESTIGATIVE REPORT

Predictive Value of Obsessive Compulsive Symptoms Involving the Skin on Quality of Life in Patients with Acne Vulgaris

Yasin BEZ[1], Yavuz YESILOVA[2], Mustafa ARI[3], Mehmet Cemal KAYA[1], Gokay ALPAK[4] and Mahmut BULUT[1]
[1]Department of Psychiatry, Dicle University School of Medicine, Diyarbakir, [2]Department of Dermatology, Harran University School of Medicine, Sanliurfa, [3]Department of Psychiatry, Mustafa Kemal University School of Medicine, Antakya, and [4]Department of Psychiatry, Gaziantep University School of Medicine, Gaziantep, Turkey

Acne is one of the most common dermatological diseases, and obsessive compulsive disorder is among the most frequent psychiatric conditions seen in dermatology clinics. Comorbidity of these conditions may therefore be expected. The aim of this study was to measure obsessive compulsive symptoms and quality of life in patients with acne vulgaris, compare them with those of healthy control subjects, and determine whether there is any predictive value of obsessive compulsive symptoms for quality of life in patients with acne. Obsessive compulsive symptoms and quality of life measurements of 146 patients with acne vulgaris and 94 healthy control subjects were made using the Maudsley Obsessive Compulsive Questionnaire and Short Form-36 in a cross-sectional design. Patients with acne vulgaris had lower scores for physical functioning, physical role dysfunction, general health perception, vitality, and emotional role dysfunction. They also had higher scores for checking, slowness, and rumination. The only predictor of physical functioning and vitality dimensions of health-related quality of life in these patients was rumination score. Obsessive compulsive symptoms in patients with acne vulgaris are higher than in controls, and this may correlate with both disease severity and quality of life for patients. ***Key words: acne vulgaris; excessive cleaning; obsessive compulsive symptoms; quality of life; rumination.***

Accepted Jan 18, 2013; Epub ahead of print Apr 10, 2013

Acta Derm Venereol 2013; 93: 679–683.

Yavuz Yesilova, Department of Dermatology, Harran University College (School) Medicine, TR-63300 Sanliurfa, Turkey. E-mail: yavuzyesilova@hotmail.com

Acne is a common dermatological disorder mainly affecting adolescents, but which also affects the adult population to some extent (1). Although acne is not physically debilitating, it may have a severe effect on social and psychological functioning (2). Various psychiatric conditions, such as anxiety, depression, lowered self-esteem, and reduced quality of life (QoL), have been reported in patients with acne (3–6).

Obsessive compulsive disorder (OCD) is a common psychiatric illness with a prevalence of 1–2%, characterized by obsessions, compulsions, or both, which cause significant psychological distress or disability (7). Obsessions/compulsions are thought to be among the most commonly encountered types of psychopathological conditions accompanying dermatological diseases (8); 2 previous studies reported the rate of Diagnostic and Statistical Manual of Mental Disorders (DSM) diagnoses of OCD to be 20% and 24.7% among patients admitted to dermatology outpatient clinics (9, 10). In another study, compulsions involving the skin were listed among the more frequently encountered problems in patients who visited dermatology clinics (11).

Acne is one of the most frequent dermatological diseases seen in dermatology clinics, and OCD is among the most frequent psychiatric conditions seen in dermatology clinics (12). Thus, comorbidity of these conditions may be expected in daily clinical practice. Studies have shown associations between acne and obsessions/compulsions (12–17). A compulsive urge to manipulate the skin has been reported in patients with acne excoriée (14, 18). Increased psychopathology may become both a result, as well as a partial cause, of persisting acne in these patients, and a vicious cycle may develop. In addition to compulsion to excoriate among patients with acne, they may also have obsessive thoughts about the oiliness of their faces.

Although some aspects of OCD seen in dermatological diseases, including acne excoriée, have been studied previously, to the best of our knowledge the association between obsessive compulsive symptoms and QoL in patients with acne vulgaris has not yet been studied thoroughly. The aims of this study were to measure obsessive compulsive symptoms and QoL in patients with acne vulgaris and compare the results with those for healthy control subjects.

MATERIALS AND METHODS

Subjects

Among the admissions to dermatology outpatient clinic of Silvan State Hospital located in southeastern part of Turkey 146 consecutive patients with acne vulgaris who agreed to participate and gave informed consent were included in the study. The study period was between January 2010 and November 2010. Inclusion criteria for patients diagnosed with acne vulgaris were: age over 15 years; educated to at least primary school level; not taking any medication; and willingness to

participate in the study. Patients were excluded if they had any other dermatological disorder or medical disease that might cause psychological distress.

The healthy control group in this study comprised 94 age- and sex-matched subjects who were close relatives of the patients with acne, and who reported having no dermatological symptoms or other diseases. Control subjects also gave informed consent to participate in the study.

Data collection and measurements

Semi-structured interview form. This was prepared by the authors to collect demographic variables including age, gender, educational level and marital status.

Global Acne Grading System (GAGS). The GAGS is a quantitative scoring system to assess acne severity. It was first developed by Doshi et al. in 1997 (19). The total severity score is derived from summation of 6 regional sub-scores, each of which is derived by multiplying the factor for each region (factor for forehead and each cheek is 2, chin and nose is 1 and chest and upper back is 3) by the most heavily weighted lesion within each region (1 for ≥ 1 comedone, 2 for ≥ 1 papule, 3 for ≥ 1 pustule and 4 for ≥ 1 nodule). The regional factors were derived from consideration of surface area, distribution and density of pilosebaceous units. The severity was graded as mild if the score was 1–18, moderate 19–30, severe 31–38, and very severe if the score was more than 38 (19, 20).

Maudsley Obsessive Compulsive Questionnaire (MOCQ). The MOCQ was developed by Hodgson & Rachman (21) in 1977 to measure obsessive and compulsive symptoms. It is used for assessing the obsessive and compulsive symptoms in psychiatric patients and as a screening tool in other populations. The original questionnaire comprises 30 yes/no choice questions and provides 4 subscale scores, including checking, cleaning, slowness, and doubting. MOCQ has no defined cut-off scores for obsessions and compulsions. Higher scores reflect increased severity. The validity and reliability of the Turkish version of MOCQ was demonstrated by Erol & Savasir in 1988 (22). The Turkish version of the questionnaire contains an additional 7 questions from the Minnesota Multiphasic Personality Inventory (MMPI) about rumination. Thus, the Turkish version of the MOCQ provides a rumination sub-score, which is not included in the original version (22).

Short Form-36 (SF-36). The SF-36 is the most widely used self-report scale to measure health-related QoL. It successfully measures patients with medical or psychological disorders as well as healthy subjects. The SF-36 can be used to assess both positive and negative aspects of health, and it is accepted to be sensitive to small changes in disability status. It was developed by Ware & Sherbourne in 1992 (23). It provides scores ranging between 0 and 100, which indicate QoL in 8 dimensions of health (physical functioning, physical role difficulty, bodily pain, general health perception, vitality, social functioning, emotional role difficulty, mental health). Higher scores reflect a better QoL. The validity and reliability of the Turkish version of the SF-36 was demonstrated by Kocyigit et al. in 1999 (24).

Hospital Anxiety and Depression Scale (HADS). The HADS was first developed by Zigmond & Snaith in 1983 (25). It consists of 14 questions with multiple choices. It provides 2 sub-scores (anxiety and depression) and a total score. It is accepted as a reliable screening instrument for clinically significant anxiety and depression and is a valid measure of the severity of these disorders (26). The HADS total score is also a valid measure of "emotional distress" or "psychological distress", thus the HADS can be used as a measure of overall psychiatric morbidity (27). The validity and reliability of the Turkish version of HADS was demonstrated by Aydemir et al. in 1997 (28).

Procedure

An interview form prepared by the authors was used to collect data on the demographic and clinical features of both groups. All patients underwent a complete dermatological examination and completed the GAGS. All participants also completed a global measure of anxiety and depression (HADS), an inventory measuring obsessions and compulsions (MOCQ), and a quality of life scale (SF-36).

Statistical analysis

Statistical analysis was carried out using the Statistical Package for Social Sciences 11.5 (SPSS 11.5) software. Student's *t*-test was used for the comparison of continuous variables, and χ^2 test for the comparison of categorical variables. Pearson correlation analysis was used in the evaluation of the correlation between scores of the different scales and other relevant variables. Demographic and clinical variables that were likely to influence disability were assessed by multiple linear regression analysis.

RESULTS

The mean age of the 146 patients with acne vulgaris was 20.5 ± 4.7 years (range 15–38 years; 70 males [47.9%], 76 females [52.1%]). In this group 128 (87.7%) patients were single and 18 (12.3%) patients were married. Their mean duration of education was 11.6 ± 2.8 years, starting from 7 years of age. The mean duration of acne was 47.3 ± 37.5 months (range 1–168 months). Mean acne severity, determined by GAGS, was 14.8 ± 7.2 (range 4–32).

The healthy control group comprised 94 subjects, mean age 20.9 ± 5.1 years (range 15–32 years; 43 males [45.7%], 51 females [54.3%]). In the control group 76 (81%) subjects were single and 18 (19%) subjects were married. Their mean duration of education was 11.5 ± 3.0 years.

None of the above demographic variables showed any statistically significant difference between the acne vulgaris group and the control group.

The mean scores of psychiatric measurements (MOCQ and HADS) and health-related quality of life (SF-36) of the patients with acne vulgaris and control subjects are shown in Table I. Patients with acne vulgaris had higher MOCQ scores for checking, slowness, and rumination than the healthy control subjects. In terms of QoL they showed significantly lower scores for physical functioning, physical role difficulty, general health perception, vitality, emotional role difficulty than the control subjects. Both groups were similar in terms of HADS subscores and total score (Table I). In the acne vulgaris patient group, there was no gender difference in terms of anxiety, depression, QoL dimensions and obsessive compulsive symptoms.

Correlations between age, education, acne duration and severity, levels of obsessive compulsive symptoms and health-related QoL dimensions in patients with acne vulgaris are shown in Table II. There was no significant correlation between the duration or severity of acne and

Table I. *Comparison of psychological measurements of patients with acne vulgaris (*n = *146) and healthy control subjects (*n = *94)*

	Acne vulgaris Mean ± SD	Healthy controls Mean ± SD	*t*	*p*
HADS				
Anxiety	8.47 ± 4.13	8.15 ± 4.043	0.67	0.52
Depression	6.77 ± 3.61	6.48 ± 2.96	0.60	0.55
Total	15.16 ± 6.78	14.60 ± 6.02	0.66	0.51
SF-36				
Physical functioning	72.74 ± 24.07	79.04 ± 20.12	–2.11	**0.03**
Physical role difficulty	52.34 ± 35.84	63.03 ± 35.68	–2.26	**0.03**
Bodily pain	60.67 ± 19.04	57.32 ± 24.02	1.17	0.25
General health perception	53.43 ± 19.13	60.89 ± 18.15	–2.92	**0.01**
Vitality	52.27 ± 19.98	59.57 ± 20.32	–2.68	**0.01**
Social functioning	64.48 ± 25.40	67.02 ± 24.10	–0.76	0.45
Emotional role difficulty	49.42 ± 37.49	59.92 ± 36.76	–2.13	**0.03**
Mental health	53.36 ± 20.11	56.43 ± 19.87	–1.13	0.26
MOCQ				
Checking	3.82 ± 2.24	3.00 ± 2.13	2.80	**0.01**
Cleaning	5.42 ± 2.05	4.98 ± 1.99	1.64	0.11
Slowness	3.14 ± 1.82	2.39 ± 1.40	3.59	**0.01**
Doubting	3.69 ± 1.51	3.70 ± 1.48	–0.05	0.96
Rumination	4.83 ± 2.41	4.03 ± 2.31	2.54	**0.01**

Significant values are shown in bold.
HADS: Hospital Anxiety and Depression Scale; SF-36: Short Form-36 (health-related quality of life scale); MOCQ: Maudsley Obsessive Compulsive Questionnaire.

any dimension of QoL. Acne duration was negatively correlated with cleaning score in MOCQ. All dimensions of the SF-36 were negatively correlated with rumination level measured with the MOCQ. Negative correlations were also present between general health perception dimension and slowness, vitality dimension and both slowness and doubting. On the other hand, physical and emotional role functioning dimensions were both negatively correlated with all dimensions of the MOCQ. In addition, education level was positively correlated with all dimensions of QoL expect bodily pain and social functioning.

In this study, as shown in Table I, some dimensions of QoL, including physical functioning, physical role difficulty, general health perception, vitality, and emotional role difficulty, were poorer in patients with acne vulgaris. Multiple linear regression models were constructed for those dimensions of QoL that included each of these QoL dimensions as dependent variables separately. Age, duration of education, acne duration and severity, total score and sub-scores of HADS, gender, marital status, and scores obtained from all dimensions of MOCQ have been introduced into these regression models as independent variables. Among the generated models only two models, those tested independent predictors of physical functioning and vitality, were significant ($F = 2.412$, $R = 0.392$, $R^2 = 0.151$, adjusted $R^2 = 0.90$, $p = 0.011$ for physical functioning; $F = 3.712$, $R = 0.488$, $R^2 = 0.238$, adjusted $R^2 = 0.174$, $p < 0.001$ for vitality). Rumination score was found to be the only predictor of both dimensions of quality of life in patients with acne vulgaris ($\beta = –3.734$ $p = 0.001$; $\beta = –2.077$ $p = 0.027$, respectively).

DISCUSSION

OCD has been reported to be the second most common psychiatric disorder in dermatology clinics, following depression (29). Compulsions involving the skin have been reported to be among the more frequently encountered problems in patients visiting dermatology clinics. They have also been reported to reflect an underlying OCD in dermatology patients. For example, Fineberg et al. (9) reported a DSM diagnosis of OCD in 20% of 92 consecutive dermatology referrals and concluded

Table II. *Correlations between acne duration, global acne grading score, quality of life dimensions, and obsessive compulsive symptoms in patients with acne vulgaris*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0.0	–0.10	–0.13	0.17*	0.01	0.02	–0.02	0.06	0.16	0.02	–0.07	–0.18*	–0.12	–0.07	–0.16
2		0.0	0.14	0.05	–0.07	0.02	0.02	0.06	0.03	0.01	–0.09	–0.09	–0.10	–0.05	–0.05
3			0.0	0.30**	0.21*	0.32**	0.31**	0.20*	0.27**	0.28**	–0.08	0.05	–0.01	–0.13	–0.23**
4				0.0	0.27**	0.35**	0.34**	0.34**	0.72**	0.37**	–0.19*	–0.19*	–0.21*	–0.21*	–0.30**
5					0.0	0.34**	0.39**	0.36**	0.25**	0.35**	–0.11	–0.03	–0.17	–0.09	–0.22*
6						0.0	0.63**	0.45**	0.38**	0.50**	–0.08	–0.12	–0.18*	–0.11	–0.29**
7							0.0	0.50**	0.31**	0.68**	–0.17	–0.05	–0.21*	–0.18*	–0.33**
8								0.0	0.38**	0.44**	–0.12	–0.17	–0.18*	–0.07	–0.29**
9									0.0	0.30**	–0.16	–0.23**	–0.24**	–0.17*	–0.29**
10										0.0	–0.12	–0.04	–0.11	–0.12	–0.19*
11											0.0	0.52**	0.63**	0.49**	0.56**
12												0.0	0.47**	0.42**	0.39**
13													0.0	0.47**	0.54**
14														0.0	0.49**
15															0.0

*$p < 0.05$, **$p < 0.01$.
SF-36: Short Form-36 (health-related quality of life); MOCQ: Maudsley Obsessive Compulsive Questionnaire; 1: acne duration, 2: global acne grading scale, 3: SF-36 physical functioning, 4: SF-36 physical role difficulty, 5: SF-36 bodily pain, 6: SF-36 general health perception, 7: SF-36 vitality, 8: SF-36 social functioning, 9: SF-36 emotional role difficulty, 10: SF-36 mental health, 11: MOCQ-checking, 12: MOCQ-cleaning, 13: MOCQ-slowness, 14: MOCQ-doubting, 15: MOCQ-rumination.

that there was a high prevalence of clinically relevant OCD in dermatology patients. In addition, Demet et al. (10) reported a diagnosis of OCD in 24.7% of 166 patients admitted to a dermatology outpatient clinic. It is perhaps important to note that, in their study, 43.9% of patients with OCD also had sebaceous gland diseases including acne as the most common type. In our study, the higher levels of checking, slowness, and rumination, found in patients with acne vulgaris, appear to be consistent with the results of the above-mentioned studies, which reported increased frequency of OCD in dermatology clinics. Further support for this suggestion comes from some recent molecular studies showing the involvement of cytokines and corticotropin-releasing hormone in the pathophysiology of acne, factors which are known to play a role in many psychiatric conditions, such as anxiety and depression (30–32).

Many patients experience emotional sequelae of having a disfiguring skin disease (33). Thus, acne vulgaris may account for the high level of obsessive compulsive symptomatology in our study population. In addition, patients with acne may have thoughts or urges related to excessive picking or scratching of their normal skin or skin with minimal surface texture irregularities (33, 34). In addition to the compulsion to excoriate among patients with acne, there is also a common view that they may have obsessive thoughts about the oiliness of their faces. The negative correlation between duration of acne and cleaning score shown in patients with acne vulgaris supports this view, given the fact that patients may be habituated to their feelings of greasiness over time. The high rumination score found in patients with acne vulgaris in our study may be related to the compulsion to excoriate surface texture irregularities on their skin or to obsessive thoughts about their appearance. Thus, one may expect high scores for checking and slowness in these patients as they are thought to be preoccupied with their appearance. On the other hand, studies have reported an underlying depressive disorder in patients with acne who are excessively preoccupied with their skin (12). However, the similar levels of depression in patients with acne vulgaris and healthy control subjects in our study, as determined by HADS, greatly reduces the probability of the existence of underlying depression in patients with acne vulgaris.

Numerous studies have reported a significant decrease in QoL in patients with acne (3, 35–38). The results of the present study, showing decreased physical functioning, physical role dysfunction, general health perception, vitality, emotional role dysfunction scores in patients with acne vulgaris reinforce those of previous studies (36–38). For example, in a recent study of 454 patients with acne, the same dimensions of QoL, except general health perception, were also reported to be below 60% (36). The results of studies on the relationship between QoL and the duration and severity of illness, and gender, are extremely variable and inconsistent (38). In our study, there were no correlations between duration and severity of acne, and QoL. In addition, any gender difference was not observed in terms of QoL dimensions.

Some psychiatric symptoms, such as anxiety and depression, are well-known factors associated with QoL in patients with acne (39–41). However, to the best of our knowledge the relationship between obsessive compulsive symptomatology and health-related QoL has not been reported previously. According to our findings, worse physical and emotional role functioning are associated with an increase in obsessive compulsive symptoms. Furthermore, increased rumination in patients with acne vulgaris was negatively correlated with worse QoL in all dimensions. Slowness and doubting were also associated with poorer vitality, whereas slowness alone was correlated with worse general health perception. Given our findings, one may conclude that obsessive compulsive symptoms are closely associated with QoL in patients with acne vulgaris. Regression analysis concluded that the QoL dimensions physical functioning and vitality in these patients were predicted only by their reported rumination level. Thus, obsessive compulsive symptoms, at least rumination, may account for the deterioration in QoL experienced by patients with acne vulgaris.

This study has some limitations. First, to assess the obsessive compulsive symptoms, a scale rated by clinicians would be more appropriate. In addition, identifying the frequency of OCD in addition to its severity would provide further information about its comorbidity with acne vulgaris. Secondly, it would be better to assess QoL with a scale more specific to patients with acne vulgaris rather than using the SF-36, which is a general health-related QoL measure. However, to assess associations between obsessive compulsive symptoms and QoL might not be possible if a scale specific for acne were used. Thirdly, we studied the obsessive compulsive symptoms of patients with acne vulgaris who live in a very small area of Turkey, and these results may not be applicable to a wider population.

In conclusion, the severity of obsessive compulsive symptoms may be greater in patients with acne vulgaris than in healthy control subjects and may correlate with QoL. This relationship should be taken into account by clinicians, in order to provide better healthcare, referral and treatment for patients with acne vulgaris.

REFERENCES

1. Krowchuck DP. Managing acne in adolescents. Pediatr Clin North Am 2000; 47: 841–857.
2. Rapp DA, Brenes GA, Feldman SR, Fleischer AB Jr, Graham GF, Dailey M, et al. Anger and acne: implications for quality of life, patient satisfaction and clinical care. Br J Dermatol 2004; 151: 183–189.

3. Mallon E, Newton JN, Klassen A, Stewart-Brown SL, Ryan TJ, Finlay AY. The quality of life in acne: a comparison with general medical conditions using generic questionnaires. Br J Dermatol 1999; 140: 672–676.
4. Cotterill JA, Cunliffe WJ. Suicide in dermatological patients. Br J Dermatol 1997; 137: 246–250.
5. Smithard A, Glazebrook C, Williams HC. Acne prevalence, knowledge about acne and psychological morbidity in mid-adolescence: a community-based study. Br J Dermatol 2001; 145: 274–279.
6. Bez Y, Yesilova Y, Kaya MC, Sir A. High social phobia frequency and related disability in patients with acne vulgaris. Eur J Dermtol 2011; 21: 756–760.
7. Kordon A, Broocks A, Hohagen F. Obsessive-compulsive disorders in general practice. How the obsessive-compulsive neurotic is revealed by skin and hair. MMW Fortschr Med 2003; 145: 4–7.
8. Koo JY, Pham CT. Psychodermatology. Practical guidelines on pharmacotherapy. Arch Dermatol 1992; 128: 381–388.
9. Fineberg NA, O'Doherty C, Rajagopal S, Reddy K, Banks A, Gale TM. How common is obsessive-compulsive disorder in a dermatology outpatient clinic? J Clin Psychiatry 2003; 64: 152–155.
10. Demet MM, Deveci A, Taskin EO, Ermertcan AT, Yurtsever F, Deniz F, et al. Obsessive-compulsive disorder in a dermatology outpatient clinic. Gen Hosp Psychiatry 2005; 27: 426–430.
11. Folks DG, Warnock JK. Psychocutaneous disorders. Curr Psychiatry Rep 2001; 3: 219–225.
12. Gupta MA, Gupta AK. The use of antidepressant drugs in dermatology. J Eur Acad Dermatol Venerol 2001; 15: 512–518.
13. Koo JY, Smith LL. Obsessive-compulsive disorders in the pediatric dermatology practice. Pediatr Dermatol 1991; 8: 107–113.
14. Bach M, Bach D. Psychiatric and psychometric issues in acne excoriée. Psychother Psychosom 1993; 60: 201–210.
15. Molinski H, Rechenberger I. Psychosomatics of acne. Fortschr Med 1977; 95: 2149–2153.
16. Shukla R, Sasseville D. Psychopharmacology in psychodermatology. J Cutan Med Surg 2008; 12: 255–267.
17. Kellett SC, Gawkrodger DJ. The psychological and emotional impact of acne and the effect of treatment with isotretinoin. Br J Dermatol 1999; 140: 273–282.
18. Arnold LM, Auchenbach MB, McElroy SL. Psychogenic excoriation. Clinical features, proposed diagnostic criteria, epidemiology and approaches to treatment. CNS Drugs 2001; 15: 351–359.
19. Doshi A, Zaheer A, Stiller MJ. A comparison of current acne grading systems and proposal of a novel system. Int J Dermatol 1997; 36: 416–418.
20. Allen BS, Smith G. Various parameters for grading acne vulgaris. Arch Dermatol 1982; 118: 23–25.
21. Hodgson R, Rochman. Obsessional-compulsive complaints. GATA, Ankara, Behav Res Ther 1977; 15: 389–395.
22. Erol N, Savasir I. Maudsley Obsessive compulsive question list. 24th National Psychiatry and Neurological Sciences Congress Scientific Program Abstracts Book 1988; p. 104–114.
23. Ware JE, Sherbourne CD. The MOS 36-item Short-Form health survey (SF-36). I. Conceptual framework and item selection. Med Care 1992; 30: 473–483.
24. Kocyigit H, Aydemir O, Fisek G, Olmez N, Memis A. Validity and reliability of Turkish version of Short Form-36 (SF-36). J Drug Treatment 1999; 12: 102–106.
25. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatrica Scand 1983; 67: 361–370.
26. Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the hospital anxiety and depression scale: an updated literature review. J Psychosomatic Res 2002; 52: 69–77.
27. Martin CR, Tweed AE, Metcalfe MS. A psychometric evaluation of the hospital anxiety and depression scale in patients diagnosed with end-stage renal disease. Br J Psychol 1975; 43: 522–527.
28. Aydemir O, Guvenir T, Kuey L, Kultur S. Validity and reliability of Turkish version of Hospital Anxiety and Depression Scale. Turk Psikiyatri Derg 1997; 8: 280–287.
29. Gupta MA, Gupta AK, Ellis CN, Koblenzer CS. Psychiatric evaluation of the dermatology patient. Dermatol Clin 2005; 23: 591–599.
30. Ganceviciene R, Graziene V, Fimmel S, Zouboulis CC. Involvement of the corticotropin-releasing hormone system in the pathogenesis of acne vulgaris. Br J Dermatol 2009; 160: 345–352.
31. Taylor M, Gonzalez M, Porter R. Pathways to inflammation: acne pathophysiology. Eur J Dermatol 2011; 21: 323–333.
32. Elewa RM, Abdallah M, Youssef N, Zouboulis CC. Aging-related changes in cutaneous corticotropin-releasing hormone system reflect a defective neuroendocrine-stress response in aging. Rejuvenation Res 2012; 15: 366–373.
33. Lee CS, Accordino R, Howard J, Koo J. Psychopharmacology in psychodermatology. Dermatol Ther 2008; 21: 69–82.
34. Bowes LE, Alster TS. Treatment of facial scarring and ulceration resulting from acne excoriée with 585-nm pulsed dye laser irradiation and cognitive psychotherapy. Dermatol Surg 2004; 30: 934–938.
35. Lasek RJ, Chren MM. Acne vulgaris and the quality of life of adult dermatology patients. Arch Dermatol 1998; 134: 454–458.
36. Al Robaee AA. Assessment of general health and quality of life in patients with acne using a validated generic questionnaire. Acta Dermatovenerol Alp Panonica Adriat 2009; 18: 157–164.
37. Berg M, Lindberg M. Possible gender differences in the quality of life and choice of therapy in acne. J Eur Acad Dermatol Venerol 2011; 25: 969–972.
38. Abdel-Hafez K, Mahran AM, Hofny ER, Mohammed KA, Darweesh AM, Aal AA. The impact of acne vulgaris on the quality of life and psychologic status in patients from upper Egypt. Int J Dermatol 2009; 48: 280–285.
39. Yazici K, Baz K, Yazici AE, Köktürk A, Tot S, Demirseren D, et al. Disease-specific quality of life is associated with anxiety and depression in patients with acne. J Eur Acad Dermatol Venereol 2004; 18: 435–439.
40. Gupta MA, Gupta AK. Depression and suicidal ideation in dermatology patients with acne, alopecia areata, atopic dermatitis and psoriasis. Br J Dermatol 1998; 139: 846–850.
41. Kaymak Y, Taner E, Taner Y. Comparison of depression, anxiety and life quality in acne vulgaris patients who were treated with either isotretinoin or topical agents. Int J Dermatol 2009; 48: 41–46.